

**No. 681,923.**

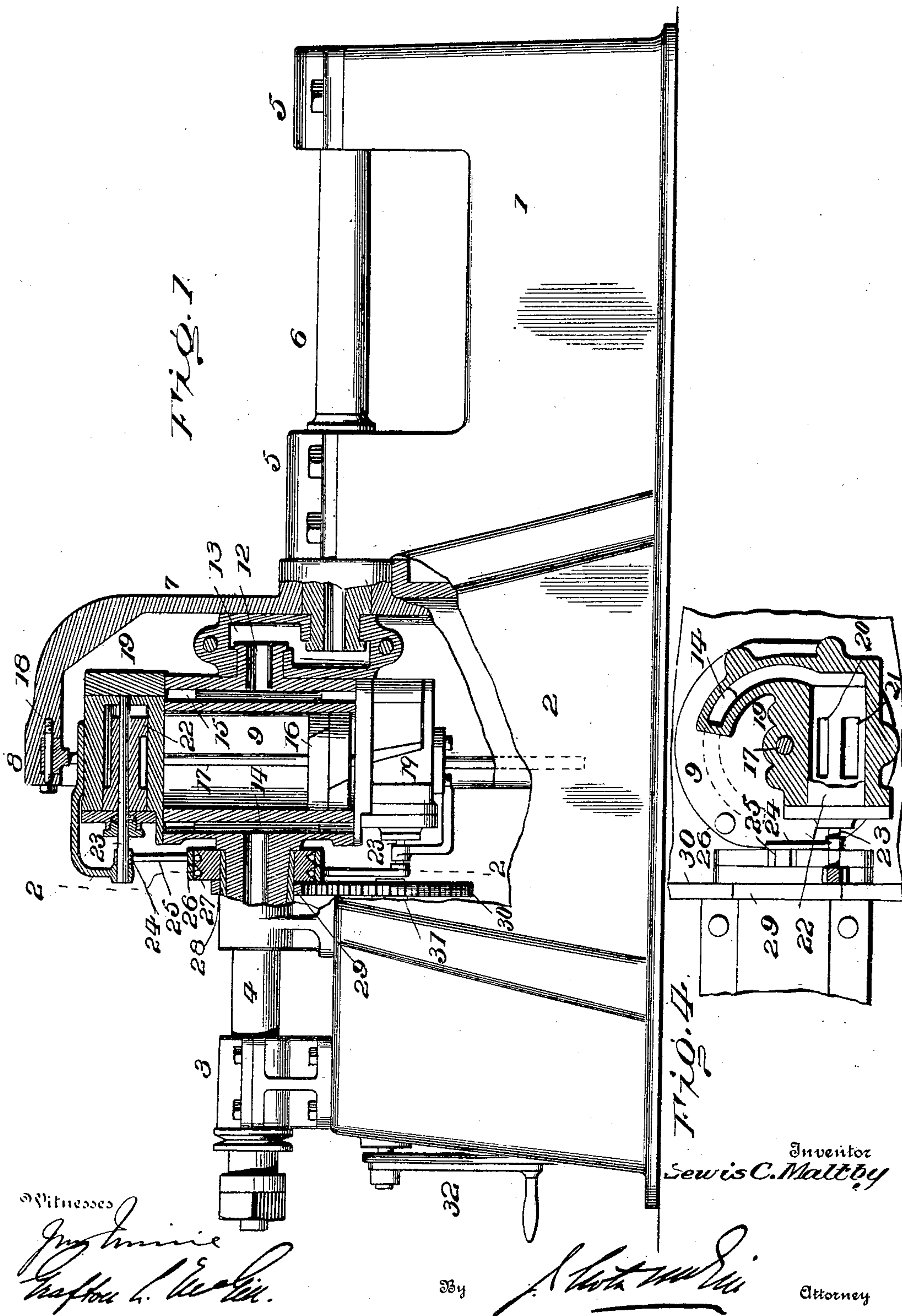
**Patented Sept. 3, 1901.**

**L. C. MALTBY.**  
**ROTARY ENGINE.**

(Application filed Dec. 4, 1900.)

(No Model.)

**2 Sheets—Sheet 1.**



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2 Sheets—Sheet 2.

Fig. 2.

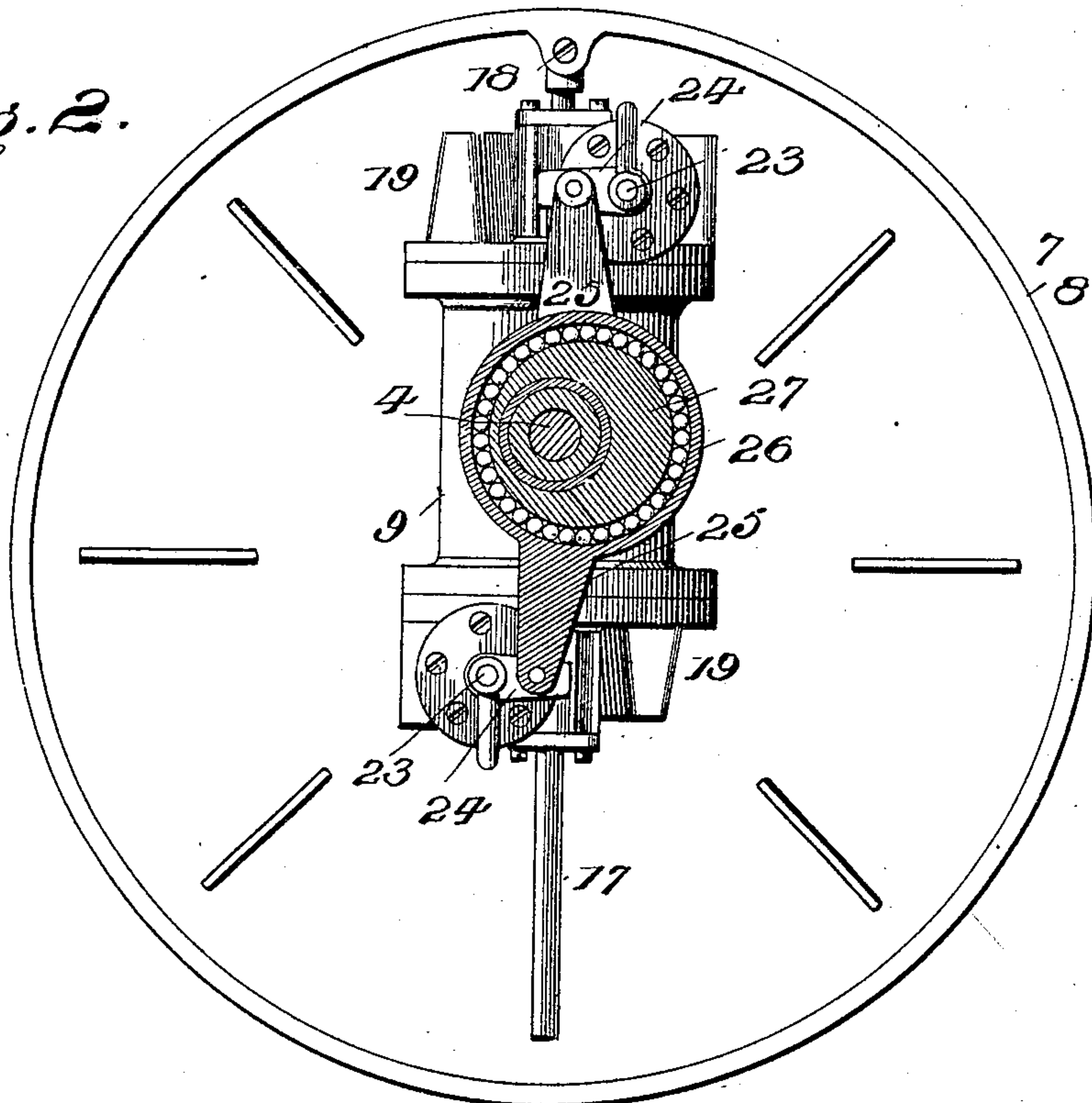
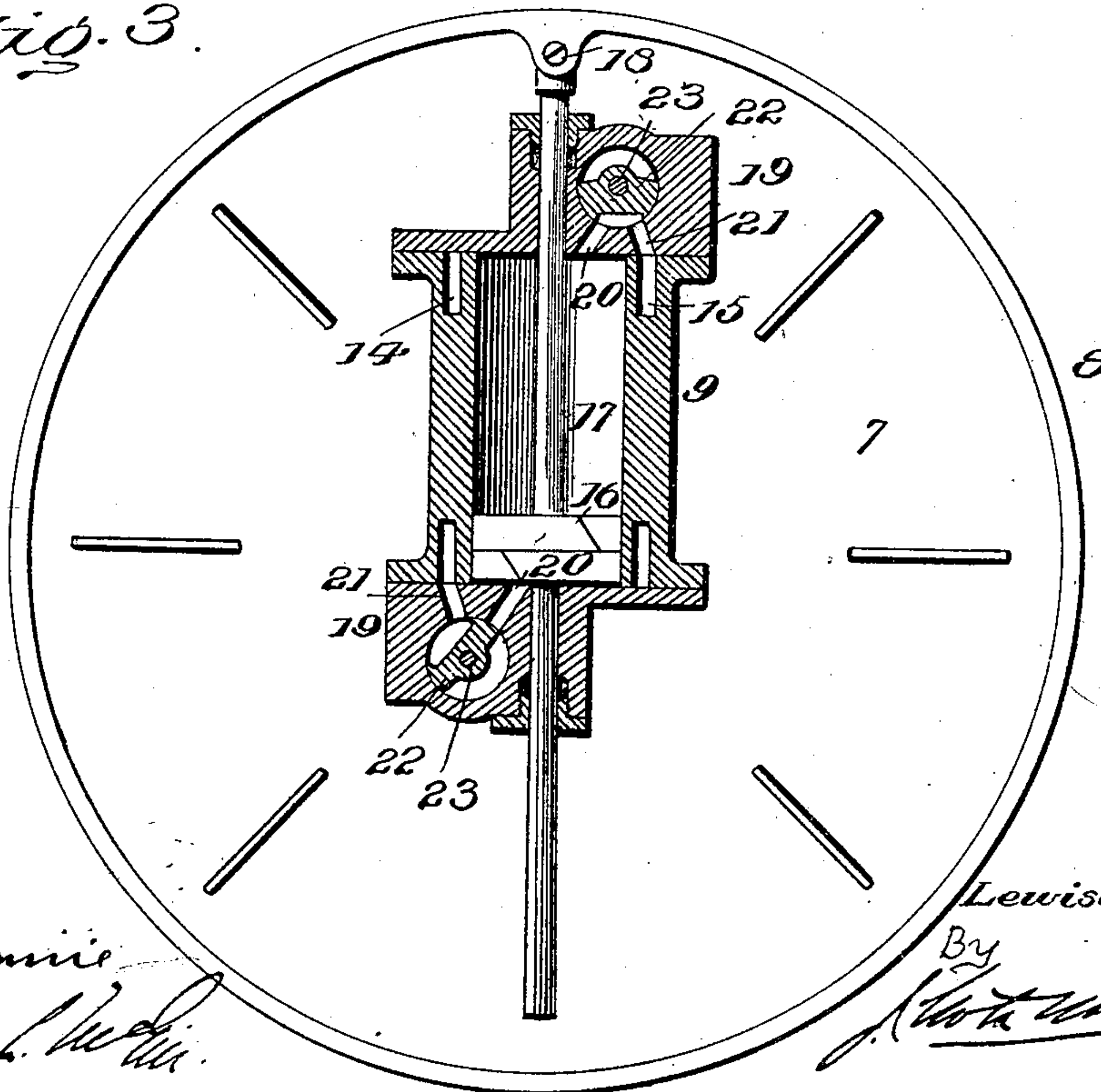


Fig. 3.



Witnesses

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Inventor

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By

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# UNITED STATES PATENT OFFICE.

LEWIS C. MALTBY, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR  
TO EVAN S. STOKES, TRUSTEE, OF SAME PLACE.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 681,923, dated September 3, 1901.

Application filed December 4, 1900. Serial No. 38,644. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS C. MALTBY, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention contemplates certain new and useful improvements in rotary engines of the reciprocating type—that is, engines having a rotating cylinder and a reciprocating piston. In engines of this character as heretofore constructed steam is admitted at points other than in direct line with the piston—that is, not on opposite sides of a single piston. It has been found that to this fact is due loss of power amounting to about one-fifth the volume of steam. To avoid this loss and to utilize the full force or power of the steam is the primary object of my invention. To this end I mount a steam-valve chest upon each end of the rotary-piston cylinder, so that the steam entering the latter will exert its full force directly upon a single piston reciprocally moved within the cylinder. The steam is conveyed to the cylinder through a tubular shaft, which opens into ports leading to the end valve-chests. The exhaust is carried off through a second tubular shaft, upon which is mounted a fly-wheel, to which is connected the piston-rod, a hollow link forming a passage-way between the exhaust-chamber in the cylinder and the said shaft.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, part in elevation and part in section. Fig. 2 is a cross-section on line 2 2, Fig. 1. Fig. 3 is a face view of the fly-wheel with the cylinder in vertical section. Fig. 4 is a horizontal sectional view through one of the valve-chests, the valve and the engine base-frame being broken away.

Referring to the drawings, 1 designates the engine base-frame, formed with a central chamber 2; 3, the bearings of a tubular shaft 4, and 5 the bearings of a second tubular shaft

6, upon which is keyed a fly-wheel 7, rotatable within chamber 2 and having an overhanging rim 8.

9 is a steam-cylinder centrally mounted at one side upon the inner end of shaft 4, and at its opposite side this cylinder is provided with a hollow trunnion 12, which is connected by a hollow link 13 to the inner end of shaft 6. The shaft 4 opens into a steam supply or inlet chamber 14, formed in the wall of cylinder 9, while the hollow trunnion and link lead from the exhaust-chamber 15, also formed in the wall of said cylinder. Within the cylinder is a piston 16, the rod of 17 which is passed through both heads of the cylinder, and at one end it is connected by a bolt 18 to the rim of the fly-wheel. The axial bearings of the cylinder and the fly-wheel being on different centers, the revolution of these two parts produces an eccentric movement, resulting in the reciprocation of the piston. Upon each cylinder-head is mounted a valve-chest 19, which receives steam at one end from the steam-chamber 14. Each chest is provided with two ports 20 and 21, the former for admitting steam to the cylinder 9 and the latter registering with the exhaust-chamber 15. Within each chest is a valve 22, of bonnet formation, for controlling the ports 20 and 21, each valve being given a reciprocatory axial motion. The pin or shaft 23 of each valve is extended through one end of its respective chamber, and to an arm 24 on the end thereof is pivotally secured an arm 25 of an eccentric-band 26, the arms of the two bands being extended in opposite directions, so as to impart a reverse movement to the valves—that is, as one valve is turned to allow steam to pass through port 20 to the piston-cylinder the other valve is positioned to establish communication between the ports 20 and 21 at the other end of the cylinder, and thus allow the steam previously admitted at such end to escape through port 21 to chamber 15, thence into and through link 13 to shaft 6, and out through the end of the latter to the atmosphere. The bands 26 encircle an eccentric 27 on an extended portion 28 of one of the bearings 3. On a hub of the eccentric is a small gear-wheel 29, meshing with a larger gear-wheel 30, fast on a shaft 31, 100



controlled by a crank-handle 32 at one end of frame 1. The eccentric is thus held stationary, save when it is desired to reverse the direction of rotation of the engine, in which event a quarter-revolution of gear-wheel 30 will effect a one-half revolution of the eccentric. It is obvious, however, that any suitable means may be employed for effecting this reversal. I preferably place ball-bearings between the bands and the eccentric to minimize friction.

In practice steam is constantly present in the steam-chamber 14, being supplied through the tubular shaft 4. The turning of the fly-wheel will through the eccentric cause the turning of the two valves, allowing steam to pass through one of the ports 20 into the cylinder 9 and bear directly upon the face of the piston, forcing the latter to the other end of the cylinder and through the connection of the piston-rod to the fly-wheel effect the rotation of the latter. As the piston reaches that end of the cylinder the valve at such end is turned to allow steam to enter through the other of the two ports 20 to force the piston in the opposite direction, and at the same time the other valve has established communication with the exhaust-port 21 to allow of the escape of the steam first admitted. From this it will be seen that by admitting steam into the ends of the piston-cylinder the same will alternately act directly upon the opposite faces of the piston, thereby utilizing its full driving power without any waste whatsoever; that the longitudinal reciprocation of the piston effects the rotation of the fly-wheel, and consequently the turning of the shaft 6, from which power may be taken at any desired point, and that by the admission of the steam through the cylinder-heads a single reciprocating piston suffices to obtain the necessary motion, which latter may be communicated to the driven shaft by any suitable connection, that shown being preferred.

I claim as my invention—

1. In a reciprocating rotary engine, the combination of the following instrumentalities: a rotary cylinder closed at its ends, a single piston in said cylinder, means for alternately admitting steam to and exhausting it from said cylinder through the end heads thereof on opposite sides of the piston and in the direction of the longitudinal reciprocation thereof, a driven shaft, and a connection between the latter and the piston-rod, substantially as set forth.

2. In a reciprocating rotary engine, the combination of the following instrumentalities: a steam-cylinder, two shafts, out of line with each other, and upon one of which said cylinder is centrally mounted, a connection between said cylinder and the other shaft, a piston within said cylinder, a connection between the rod of said piston and the last-mentioned shaft, and means on the end heads of said cylinder for alternately admitting steam to and exhausting it from said cylinder

through its end heads in the direction of the longitudinal reciprocation of the piston, as set forth.

3. In a reciprocating rotary engine, the combination of the following instrumentalities: a steam-cylinder, two shafts, out of line with each other, and upon one of which said cylinder is centrally mounted, a connection between said cylinder and the other shaft, a piston within said cylinder, a connection between the rod of said piston and the last-mentioned shaft, said cylinder having steam inlet and outlet ports in its end heads, valves for controlling said ports, and means for reciprocally operating said valves in opposite directions, as set forth.

4. In a reciprocating rotary engine, the combination of the following instrumentalities: a steam-cylinder having steam-inlet and steam-exhaust chambers, a tubular shaft opening into said steam-inlet chamber and upon which said cylinder is centrally mounted, a second tubular shaft out of line with the first-mentioned shaft, a chambered coupling between said cylinder and said second shaft, said coupling leading from said steam-exhaust chamber, means on the end heads of said cylinder for controlling the admission of steam to and its exhaust from said cylinder, means for operating said latter means in opposite directions, and a piston in said cylinder having its rod connected to said second shaft, as set forth.

5. In a reciprocating rotary engine, the combination of the following instrumentalities: a steam-cylinder having steam-inlet and steam-exhaust chambers, a tubular shaft opening into said steam-inlet chamber and upon which said cylinder is centrally mounted, a second tubular shaft out of line with the first-mentioned shaft, a chambered coupling between said cylinder and said second shaft, said coupling leading from said steam-exhaust chamber, said cylinder having steam inlet and exhaust ports in its end heads, valve-chests on said heads, and valves in said chests for controlling said ports, adjustable means for actuating said valves in opposite directions, and a piston in said cylinder having its rod connected to said second shaft, substantially as set forth.

6. In a reciprocating rotary engine, the combination of the following instrumentalities: a steam-cylinder having steam-inlet and steam-exhaust chambers, a tubular shaft opening into said steam-inlet chamber and upon which said cylinder is centrally mounted, a second tubular shaft out of line with the first-mentioned shaft, a chambered coupling between said cylinder and said second shaft, said coupling leading from said steam-exhaust chamber, said cylinder having steam inlet and exhaust ports in its end heads, valve-chests on said heads, and valves in said chests for controlling said ports, a piston in said cylinder, a connection between the rod of said piston and said second shaft, an eccentric, bands



thereon having arms connected to said valves, and means for adjusting said eccentric, substantially as set forth.

5 7. In a reciprocating engine, the combination of the following instrumentalities: a rotary cylinder closed at its ends, a single piston in said cylinder, means for alternately admitting steam to and exhausting it from said  
10 cylinder through the end heads thereof on opposite sides of the piston and in the direction of the longitudinal reciprocation of the latter, a driven shaft, a fly-wheel on the latter having an overhanging rim, and a connection between the rod of said piston and the rim of  
15 the fly-wheel, substantially as set forth.

8. In a reciprocating rotary engine, the combination of the following instrumentalities: a rotary cylinder closed at its ends, valves on

the ends of said cylinder for controlling the inlet and exhaust of steam, a piston in said  
20 cylinder, a driven shaft, a connection between said shaft and the rod of said piston, an eccentric, bands thereon having oppositely-projecting arms, connections between said arms and said valves, a gear-wheel carried by said  
25 eccentric, a second gear-wheel meshing with the former gear-wheel, and a crank-shaft for operating said second gear-wheel, substantially as set forth.

In testimony whereof I have signed this  
30 specification in the presence of two subscribing witnesses.

LEWIS C. MALTBY.

Witnesses:

GRAFTON L. MCGILL,  
FRANK S. MAGUIRE.